

include a plurality of components that make the joint rather complex and of increased manufacturing and assembly cost.

5 The object of the present invention is to provide for an angular joint of hollow metallic profile members being brought together for the formation of door or window frames and the like, said angular joint being simple in construction, easily assembled or disassembled and providing a self-aligned, rigid connection of the profile members.

10 A further object of the invention is the elimination of the need for accurately marking and subsequently opening of side apertures onto the profile members being connected, thereby substantially facilitating and speeding up of the assembly process.

15 Another object of the invention is to provide for alternative embodiments of the joint of the invention, adapting it to various applications extending beyond the field of orthogonal connections of hollow profile members being connected to form door and window frames and making the joint of the invention applicable in connections of profile members of any kind and at any angle whatsoever.

20 The angular joint of the invention comprises a slide base portion 1 and a sheet metal mobile portion 2 superimposed thereupon, the sheet metal portion 2 including upwardly extending legs 2e with indenting edges 2g, a bolt 3 being employed in the tightening process of the joint, wherein after the joint has been inserted into the hollow profile members being brought together for connection, the bolt 3 acts so as to exert an upwardly raising force onto the sheet metal mobile portion 2, whilst maintaining base portion  
25 1 at a fixed position, and subsequently leading the sharp indenting edges 2g of the sheet metal portion 1 to producing an indentation effect into the walls of the corresponding chambers 13a, 13b of the hollow profiles being

## CLAIMS

1. Joint for the angular connection of hollow profile members intended to form door/window profile frames and the like, wherein the edges of the hollow profile members have been previously cut at an angle such as to obtain a matching contact following the assembly thereof, the joint comprising a slide base portion (1) and a sheet metal mobile portion (2), a bolt (3) being employed in the tightening process of the joint, **characterized** by said slide base portion (1) having an upper flat basement (1a) with a centrally located cavity (1b) with sides symmetrically extending on either side of said flat basement (1a), each one of said sides having outer planar surfaces (1e) in sliding contact with a wall of each one of a pair of chambers (13a,13b) of the hollow profile members being brought together for connection and inner surfaces comprising a first planar section (1c), said planar section (1c) being oriented substantially parallel to said wall of chambers (13a,b) whereupon said outer planar surfaces (1e) are seated and subsequently extending into a second convergent portion (1d) terminating at a terminal edge (1f) and by said sheet metal mobile portion (2) having a similar configuration with an upper flat basement (2a) with a centrally located cavity (2b) with sides symmetrically extending on either side of said flat basement (2a), each one of said sides comprising planar side surfaces (2c) and (2d), each with a length generally equivalent to the length of underlying said surfaces (1c,1d) of said slide base portion (1), wherein at a terminal end (2f) of said side surfaces (2c,2d) said sheet metal mobile portion (2) is bent to upwardly extending sides (2e) on either side thereof terminating at sharp edges (2g), said sharp edges (2g) being adapted to produce an indentation effect into the walls of chambers (13a,13b) when the joint is being tightened, wherein said sheet metal mobile portion (2) is superimposed onto said slide base portion (1) so that said flat basement (2a)

is oriented parallel above said underlying flat basement (1a) in a direction perpendicular to a plane of symmetry  $x-x'$  passing through the plane of matching contact of the previously cut edges of said hollow profile members being brought together for connection, said side surfaces (1c,1d) of the base  
5 portion (1) and overlying side surfaces (2c,2d) of said sheet metal mobile portion (2) being symmetrically arranged on either side of said plane of symmetry  $x-x'$  and said upwardly extending sides (2e) of said sheet metal portion (2) being oriented in a direction substantially parallel to the plane of symmetry  $x-x'$ , wherein said bolt (3) passing through a hole (11a,b) lying at  
10 said plane of symmetry  $x-x'$  when being screwed exerts an upwardly pushing force onto said sheet metal mobile portion (1) until said sharp edges (2g) thereof indent the relatively softer walls of the profile members being connected, thereby resulting in a robust, self aligned connection thereof.

2. Joint for the angular connection of hollow profile members as claimed  
15 in above claim 1, characterized by that said hole (11a,b) lying at said plane of symmetry  $x-x'$  is made up by two identical halves, one half (11a) being drilled at said chamber (13a) of one of said hollow profile members and the other half (11b) being drilled at said chamber (13b) of the other of said hollow profile members being brought together for connection, said one half  
20 (11a) matching said other half (11b) along said plane of matching contact of the profiles, said two halves (11a) and (11b) forming an angle equivalent to the angle at which said hollow profile members are being connected.

3. Joint for the angular connection of hollow profile members as claimed in above claim 1, characterized by that said sharp edges (2g) of said  
25 sheet metal mobile portion producing the indentation effect may alternatively take the form of an arrangement of tooth or pointed pin protrusions or razor edge like sharp surfaces made from material harder than the material of the walls of said chambers (13a,13b) of the hollow profile members being

connected, said arrangement of tooth or pointed pin protrusions or razor edge like sharp surfaces taking the form of a single acting indentation effective surface or constituted by a pair of adjacent acting indentation effective surfaces, said surfaces coming sequentially in contact with the walls of said chambers (13a,13b) of the hollow profile members being connected.

4. Joint for the angular connection of hollow profile members as claimed in above claim 3, characterized by that said sharp edges (2g) of said sheet metal mobile portion (2) producing the indentation effect alternatively taking the form of an arrangement of single or double tooth or pointed pin protrusions or razor edge like sharp surfaces made from material harder than the material of the walls of said chambers (13a,13b) of the hollow profile members being connected are included in an independent plate item (15), said plate item (15) being introduced into a recession being formed at the terminals of said upwardly extending sides (2e) of said sheet metal portion (2).

5. Joint for the angular connection of hollow profile members as claimed in above claim 1, characterized by that said side surfaces (2c) of said sheet metal mobile portion (2) end at a bent structure of the sheet metal portion (2) thereby forming a recession (17) for the engagement of a pivotally mounted wire (16) made from steel, said pivotally mounted wire (16) having the form of a II section with the legs thereof bent to upwardly extending members with sharp edges (16g) producing the profile wall indentation effect and by that said slide base portion (1) being made in two identical portions, symmetrically on either side of said plane of symmetry x-x', said two identical portions being pivotally connected around a pivotal axis (60) thereby being appropriate for the connection of hollow profiles forming varying angles at the junction thereof and said sheet metal mobile

portion (2) being also adjustable to profile connections at varying angles by movement of said pivotally mounted end portion (16) thereof.

6. Joint for the angular connection of hollow profile members as claimed in above claim 1, characterized by that said slide base portion (1) further includes upwardly bent legs (1e') extending from said terminals (1f) thereof and following a configuration similar to said upwardly extending legs (2e) of said sheet metal portion (1), so as to form recessions allowing tight fitting therein of said upwardly extending legs (2e) of said sheet metal portion (1) and provide packaging and handling of said joint as if it were a single item.
7. Joint for the angular connection of hollow profile members as claimed in above claim 1, characterized by that said bolt (3) passing through a hole (11a,b) lying at said plane of symmetry x-x' and exerting when being screwed an upwardly pushing force onto said sheet metal mobile portion (1) until said sharp edges (2g) thereof indent the relatively softer walls of the profile members being connected, passes through an internally threaded hole at said centrally located cavity (2b) of said sheet metal mobile portion (2) and subsequently stops by contact of a sharp edge (3b) thereof onto the coaxially underlying said cavity (1b) of said base portion (1), wherein said upwardly pushing force exerted onto said sheet metal mobile portion (1) is a reaction to the force being exerted onto said cavity (1b) of said base portion (1).
8. Joint for the angular connection of hollow profile members as claimed in above claim 7, characterized by that said internally threaded hole at said centrally located cavity (2b) of said sheet metal mobile portion (2) is being formed by either expansion of the sheet metal at said cavity (2b) into a cylindrical collar (19) that is subsequently internally threaded or by the alternative addition, onto said basement (2a), of either an independent plate (18) having a planar surface (18a) with dimensions such as to fit onto said

basement (2a) of the sheet metal portion (2) and a central hole (18b) that is internally threaded and coincides with a hole being opened at said centrally located cavity (2b) on said basement (2a) when plate (18) is brought in contact with basement (2a) or of an internally threaded cylindrical collar (48) with a body portion (48a) and a central hole (48b) coinciding with said hole being opened at said centrally located cavity (2b) on said basement (2a) of the sheet metal portion (2).

9. Joint for the angular connection of hollow profile members as claimed in above claim 1, characterized by that said bolt (3) passing through a hole (11a,b) lying at said plane of symmetry x-x' and exerting when being screwed an upwardly pushing force onto said sheet metal mobile portion (1) until said sharp edges (2g) thereof indent the relatively softer walls of the profile members being connected, passes through an internally threaded hole at said centrally located cavity (1b) of said slide base portion (1) and subsequently stops by contact of a sharp edge (3b) thereof onto the coaxially overlying said cavity (2b) of said sheet metal mobile portion (2), wherein said upwardly pushing force exerted onto said sheet metal mobile portion (1) is the force being exerted onto said cavity (2b) of said sheet metal portion (1).

10. Method of angular connection of hollow profile members intended to form door/window profile frames and the like, wherein the edges of the hollow profile members have been previously cut at an angle such as to obtain a matching contact following the assembly thereof, comprising the following steps:

a. Drilling of a single hole (11a,b) made of two halves (11a), (11b), one half in each of the hollow profile members being brought together for an angular connection, the edges of said profile members having previously

being appropriately cut at an angle of half the magnitude of the angle intended by their connection,

b. inserting a joint previously assembled joint with a central bolt (3) passing through an upper sheet metal mobile portion (2) and stopping at an  
5 underlying base portion (1) thereof, through an opening (12a) of a chamber (13a) of a first one of the pair of hollow profile members to be connected, wherein half of the joint is introduced in this first one of the pair of profile members,

c. bringing a chamber (13b) of the second one of the pair of hollow  
10 profile members to be connected in a position wherein the protruding half of the joint is slidably inserted therein, thereby obtaining an accurate coincidence of the previously cut edges of the hollow profile members to be connected and further obtaining said centrally located single angular hole (11a,b) by coincidence of the two halves (11a, 11b),

d. employment of a key (14) passing through said single angular hole  
15 (11a,b) and rotation by means of the same of said bolt (3) lying coaxially along the plane of connection of the two hollow profile members that have been connected, until the sharp edges of upwardly extending sides of the sheet metal portion (2) indent the walls of said chambers (13a,13b) thereby  
20 leading to a rigid, aligned and angular connection of said hollow profile members.